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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/760,149	01/17/2004	Walter D. Mieher	KLA1P119	7190

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EXAMINER	
VALENTIN, JUAN D	
ART UNIT	PAPER NUMBER
2877	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/05/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

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Office Action Summary	Application No.	Applicant(s)	
	10/760,149	MIEHER ET AL.	
	Examiner	Art Unit	
	Juan D. Valentin II	2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 December 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *12/27/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement (IDS) submitted on 12/27/2006 was considered by the examiner. Several NPL documents were crossed out and not considered because they were not dated on the IDS.

Response to Arguments

2. Applicant's arguments filed 12/27/2006 have been fully considered but they are not persuasive.

3. The 35 U.S.C §101 rejections have been maintained. Please see the rejection below which has been further amplified.

4. Applicant has argued that Littau's method is not a method used for production process control (page 9, 5th paragraph of remarks section of amendment dated 12/27/2006). Applicant has provided no proof for this statement; examiner respectfully disagrees with applicant's assertion. In response to applicant's argument that Littau et al. and Singh et al. are nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Littau discloses that the inventive method can be utilized in an autofocus control system whereby information as to the diffraction signature analysis is used in a control system to determine focus (col. 14, lines 11-15).

It would be obvious to someone of ordinary skill in the art that "control systems" are commonly used in production environments to control process parameters insuring that proper fabrication limits are maintained. The rejection of Littau in view of Singh is deemed proper and maintained.

5. In response to applicant's argument that Littau does not disclose two grating structures with different process responses, examiner disagrees with applicant's assertion. Applicant has not proven why nor explained how Littau does not teach "two grating structures with different process responses". Littau discloses that in one embodiment, as shown in the rejection to independent claims 1, 14, 15, 18, & 19 that the dose is varied from diffraction grating to diffraction grating. Examiner is not arguing that the pattern used by Littau is different, but merely stating that by differing the exposure time and dosage between two diffraction gratings (col. 3, lines 25-27, col. 10, lines 4-16, col. 14, lines 5-11) indeed will produce different process responses as evidenced by Figs. 5-9 of Littau. Applicant has not defined in the claim what exactly a different process response is. Without a clear-cut definition, in the broadest sense of the term, a "different process response" is exactly what Littau achieves by varying the exposure time and dosage of each diffraction grating. Once again, applicant has not claimed that the diffraction grating has different size dimensions as applicant has argued (page 8, 4th paragraph of remarks section of amendment dated 12/27/2006). Just because the features are the same dimension does not mean that a spectrally reflected measurement beam will not exhibit a different response (sensitivity) from grating to grating based upon the exposure time and dosage as taught by Littau. The rejections to claims 1-27 are clearly supported by art as shown above and in the Non-Final Office Action which has been maintained below.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

6. Claims 14, 15, & 18 rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

The claims are directed to a judicial exception, specifically an abstract idea; as such, pursuant to the Interim Guidelines on Patent Eligible Subject Matter (MPEP 2106), the claims must have either physical transformation and/or a useful, concrete and tangible result. The claims fail to include transformation from one physical state to another. Although, the claims appear useful and concrete, there does not appear to be a tangible result claimed. Merely carrying the steps of identifying; determining; devising; *evaluating*; extracting; etc...would not appear to be sufficient to constitute a tangible result, since the outcome of the step has not been used in a disclosed practical application nor made available in such a manner that its usefulness in a disclosed practical application can be realized. As such, the subject matter of the claims is not patent eligible.

Practical application that produces a useful, concrete, and tangible result under Section IV d*etermines whether the claimed invention complies with the subject matter eligibility requirement of 35 U.S.C. Sec. 101,* sentence 3, in the OG Notice from 22 November 2005 "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" states "In determining whether the claim is for a "practical application," the focus is not on whether the steps taken to achieve a particular result are useful, tangible, and concrete, but rather that the final result achieved by the claimed invention is "useful, tangible, and concrete."

Further amplifying the 101 rejection, examiner notes that the final step of claims 14, 15, & 18 is "extracting". This extraction is carried out within a processor and the claimed result of this calculation is not output anywhere enabling said result to become useful and concrete as stated above. Merely claiming evaluating and/or determining does not make the result useful and/or tangible. Unless the processor carries out another step with the calculated information, how can anyone retrieve, use, and/or see the information derived by the processing step. MPEP 2106.02 clearly states:

> "If the "acts" of a claimed process manipulate only numbers, abstract concepts or ideas, or signals representing any of the foregoing, the acts are not being applied to appropriate subject matter. Gottschalk v. Benson, 409 U.S. 63, 71 - 72, 175 USPQ 673, 676 (1972). Thus, a process consisting solely of mathematical operations, i.e., converting one set of numbers into another set of numbers, does not manipulate appropriate subject matter and thus cannot constitute a statutory process.
>
> In practical terms, ***claims define non-statutory processes if they***:
>
> – *consist solely of mathematical operations without some claimed practical application*
>
> (i.e., executing a "mathematical algorithm") (emphasis added).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1-31 rejected under 35 U.S.C. 103(a) as being unpatentable over Littau et al. (USPN '930 B1, hereinafter Littau) in view of Singh et al. (USPN '422 B2, hereinafter Singh).

Claims 1, 2, 4, 9, 10, 11, 12, 13

Littau discloses obtaining scatterometry signals by performing scatterometry measurements on at least two grating structures (Fig. 2, abstract, col. 9, lines 5-35, claims 12 & 13) with different process responses, said at least two gratings structures (Figs.1A-1C) being located within the same field and in close proximity to one another, comparing (determining the difference between the two signals – claims 2, 9, 10, 11) scatterometry signals from said at least two different grating structures in order to ascertain information about one or more process parameters used to form said at least two grating structures (col. 3, lines 41-col. 4, line 11, col. 7, lines 1-22, col. 8, lines 27-30, col. 9, lines 5-35, col. 10, lines 4-16, col. 10, line 39-col. 11, line 65, col. 13, lines 6-22, col. 6, lines 34-50, & col. 14, lines 5-11).

Littau substantially teaches the claimed invention except that it fails to show controlling said one or more process parameters based on said comparison of effective values (claim 4). Singh shows that it is known to provide controlling said one or more process parameters based on said comparison (col. 3, lines 8-20, col. 4, line 59-col. 5, line 3, & col. 10, lines 24-42) for a scatterometry system. It would have been obvious to someone of ordinary skill in the art to combine the device of Littau with the process control feedback of Singh for the purposes of providing adjustments to the grating fabrication process parameters to optimize the grating formation (Singh, col. 10, lines 39-42).

Claims 3 & 5

Littau as applied above further discloses determining the effective values of said one or more process parameters by comparing the difference to calibration data (col. 13, lines 34-43).

Claim 6

Littau as applied above further discloses performing scatterometry measurements on a plurality sets of grating structures with different process responses for varying process conditions, calculating the difference between the scatterometry signals for each set of grating Structures, and mapping the differences as a function of the varying process conditions (Figs. 5-9, col. 10, line 39-col. 11, line 18, col. 11, line 54-col. 13, line 50).

Claims 7 & 8

Littau as applied above further discloses controlling said one or more process parameters in accordance with whether or not the difference is within said predetermined control limit (col. 10, line 39-col. 11, line 18).

Claim 14

Littau discloses obtaining scatterometry signals for at least two grating structures, each of the grating structures producing a scatterometry signal having different sensitivities to one or more process parameters which are desired to be controlled, comparing scatterometry signals in order to ascertain information about one or more process parameters used to form the different grating structures, each of the scatterometry targets being configured to produce different scatterometry signals, the differences being attributable at least in part to one or more process parnmeters (col. 3, lines 41-col. 4, line 11, col. 7, lines 1-22, col. 8, lines 27-30, col. 9, lines 5-

35, col. 10, lines 4-16, col. 10, line 39-col. 11, line 65, col. 13, lines 6-22, col. 6, lines 34-50, & col. 14, lines 5-11).

Claims 15, 16, & 17

Littau discloses forming a target group at a plurality of focus settings, the target group containing two or more targets with different sensitivities to focus, obtaining scatterometry signals for each of the targets in the target groups, calculating difference signals for each target group (claims 16 & 17, col. 11, lines 4-17), forming a relationship between the difference signal or a property of the difference signal to the focus settings, and determining optimal or best focus using the relationship (col. 3, lines 41-col. 4, line 11, col. 7, lines 1-22, col. 8, lines 27-30, col. 9, lines 5-35, col. 10, lines 4-16, col. 10, line 39-col. 11, line 65, col. 13, lines 6-22, col. 6, lines 34-50, & col. 14, lines 5-11).

Claims 18, 19, 20, & 21

Littau discloses measuring two or more measurable patterns that are configured to produce different scatterometry signals, the differences between the signals being due at least in part to one or more process parameters used to create the measurable patterns, and analyzing the difference signals to determine the best process conditions for a photolithographic process, the analyzing step including extracting information about one or more process parameters out of the difference signals (col. 3, lines 41-col. 4, line 11, col. 7, lines 1-22, col. 8, lines 27-30, col. 9, lines 5-35, col. 10, lines 4-16, col. 10, line 39-col. 11, line 65, col. 13, lines 6-22, col. 6, lines 34-50, & col. 14, lines 5-11).

Claim 22

Littau as applied above further discloses wherein the grating structures are printed on the surface of a work piece, the surface representing an exposed layer of photoresist, a partially developed layer of photoresist, a developed layer of photoresist, or an underlayer of the work piece (col. 9, lines 5-36).

Claim 23

Littau as applied above further discloses wherein the grating structures are located within the scribe line, device structure or within both the scribe line and the device structure (col. 3, lines 22-24).

Claims 24-31

Littau as applied above further discloses wherein the grating structures are both positive and negative tone with (col. 3, lines 41-col. 4, line 23, col. 9, line 5-col. 11, line 40).

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Juan D. Valentin II whose telephone number is (571) 272-2433. The examiner can normally be reached on Mon.-Fri..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr. can be reached on (571) 272-2800 ext. 77. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Juan D Valentin II
Examiner 2877
JDV
April 2, 2007

Gregory J. Toatley, Jr.
Supervisory Patent Examiner